

## **Managing for Today's Cattle Market and Beyond**

# ***Commodity Options as Price Insurance for Cattlemen***

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Most cattlemen are familiar with insurance, insuring their buildings against fire, their equipment against accidents, and their lives against death or injury. Insurance trades a small but certain loss, the insurance premium, for the possibility of a large but uncertain loss.

In cattle production, one of the greatest risks faced is that of unfavorable price change. Prices for cattle have been so uncertain that many times prices that were expected to be profitable - when decisions were made regarding facility investment, breeding or feeder cattle purchases - ended up unprofitable instead. Additional risk may also be incurred on the feeding side as unfavorable grain price increases may "wipe away" anticipated profits.

Because of these risks, producers might want to "insure" feeder cattle, fed cattle or feed against unfavorable price movements, while still being able to take advantage of favorable prices. Cattlemen have this opportunity by using the commodity options market.

### ***What is the Commodity Options Market?***

The commodity options market is simply a market in which producers may purchase the opportunity to sell or buy a commodity at a specified price. Purchasers in these options markets have the "opportunity" but not the "obligation" to exercise their

agreement. Therefore, the markets are appropriately named "options markets" since they deal in an option, not an obligation.

Just as cattlemen may purchase the right from an insurance firm to collect on a policy if their buildings burn, they can purchase the right to sell commodities at a specific price in case prices drop below the specified price. A separate market exists to purchase the right to buy commodities at a specified price in case prices move higher.

For instance, if one desired to buy the right to sell feeder cattle for \$65/cwt., the feeder cattle options market might provide the opportunity. By paying the market determined premium, one could then collect on the option if prices are below \$65/cwt. when the cattle were actually sold. If prices are higher than \$65/cwt., the cattle are sold for the higher price, and the cost of the premium is absorbed.

While this is a simplified version of the actual way in which producers operate in the options market, the concept is a very simple one. Just as with other types of insurance, by paying a premium, insurance can be purchased against price declines or increases. One could collect on the option only if the price moves in an unfavorable direction.

### ***The "In's and Out's" of Options Puts and Calls***

As mentioned, there are actually two types of

commodity options: a *call option* and a *put option*. The call option gives the holder the right, but not the obligation, to buy the underlying commodity from the option writer at a specified price on or before the option expiration date. The put option gives the holder the right, but not the obligation, to sell the underlying commodity to the option writer at a specified price on or before the commodity expiration date. The call option and the put option are two distinct contracts. A put option is not the opposite side of a call option. Distinguish the two types of options by remembering that the holder of the put option can choose to “put-it-to-them” that is, sell the product, while the holder of the call option can “call-upon-em” to provide the product.

### ***Buyers and Sellers***

In the option market, as in every other market, transactions require both buyers and sellers. The buyer of an option is referred to as an option holder. Holders of options may be either seekers of price insurance or speculators.

The seller of an option is sometimes referred to as an option writer. The seller may also be either a speculator or one who desires partial price protection. Whether one chooses to buy (hold) or sell (write) an option depends primarily upon one’s objectives.

Buyers and sellers of cattle options “meet” on the Chicago Mercantile Exchange. Rather than physically meeting, all transactions are carried out through brokerage firms which act as the buyer and seller representative at the exchange. For this service, the brokerage firm charges a commission. The exchange has no part in the transaction other than to insure its financial integrity. In effect, the exchange offers a place for option buyers and sellers to get together under organized rules of trade.

### ***Strike Price***

The “specified” price” in the option is referred to as the exercise price or strike price. This is the price at which the underlying commodity can be exchanged and is fixed for any given option, put or call. There will be several options with different strike prices traded during any period of time. If the price of the underlying commodity changes over time, then additional strike prices may be traded.

### ***Underlying Commodity***

The “underlying commodity” for the commodity option is not the commodity itself but rather a futures contract for that commodity. For example, an October feeder cattle option is an option to obtain an October feeder cattle futures contract. In this sense the options are on futures and not on the physical commodity.

Because options have futures contracts as their underlying commodity, each option contract “stands” for the same quantity as the underlying futures contract. That is, most grain options represent 5,000 bushels, while the live cattle option represents 40,000 pounds of fed cattle. The feeder cattle option represents 50,000 pounds of feeder cattle. Options are traded for each of the futures contract months in each of these commodities.

### ***Expiration***

Futures contracts have a definite predetermined maturity date during the delivery month. Likewise, options have a date at which they mature and expire. The specific date of expiration for the feeder cattle option contract is the same as its underlying futures contract - about the 20th of the month.

The fed cattle option contract expires the first of the futures contract month, prior to the futures contract expiration around the 20th of the month. For example, a \$65/cwt. October fed cattle put option is an opportunity to sell one October live cattle futures contract at \$65/cwt. This option can be executed by the holder on any business day until the first week in October.

### ***Option Premiums***

The put or call option writer is willing to incur an obligation in return for some compensation. The compensation is called the option premium. Using the insurance analogy, a premium is paid on an insurance policy to gain the coverage it provides, an option premium is paid to gain the rights granted in the option. The premium is determined by public outcry and acceptance in an exchange trading pit, and like all commodity prices, it can be expected to change daily.

While the interaction of supply and demand for options will ultimately determine the option premium, two major factors will interact to affect the level of premiums. The first factor is the difference between the strike price of the option and the price of the underlying commodity.

This differential in prices may give the option

“intrinsic” value. For example, consider an October feeder cattle put option with a strike price of \$60/cwt. and the underlying October feeder cattle futures with a current price of \$58/cwt. The option could be sold for at least \$2/cwt. since others would be willing to purchase the right to sell at \$60 when the market is currently \$58. This \$2 is said to be the intrinsic value. As long as the market price on the option’s underlying futures contract is below the strike price on a put option, the option has intrinsic value. Of course, the converse of the price relationship is true for a call option. A call option has intrinsic value when the market price is above the strike price.

Any option that has intrinsic value is said to be “in-the-money”. An “in-the-money” option has value to others because the market price is below the put or above the call strike price. An option is said to be “out-of-the-money” and has no intrinsic value if the current market price is above the put or below the call strike price. When the market price of the commodity and the strike price are equal, the option is said to be “at-the-money,” and will have no intrinsic value.

A second factor that will influence the option premium is the length of time to expiration of the option. Assuming all else is held constant, option premiums will usually decline in value as the time to expiration decreases. This phenomenon reflects the time value of an option. For example, in August the time premium on a \$60 September feeder cattle option will be less than the premium on a \$60 November option. The option with a longer time to expiration has a greater probability of moving “in-the-money” than the option with less time. Therefore, it is worth more on that factor alone. The longer the time period, the greater the chance that events will occur that could cause substantial movement in futures prices and change the value of the option. As a result, the option writer requires a greater premium to assume the risk of writing a longer term option.

“Out-of-money” options have a value that reflects time value. “In-the-money” options possess both time value and intrinsic value.

### *Offsetting An Option*

The method by which most holders of “in-the-money” options will realize any accrued profit is by resale of the option. This is referred to as “offsetting” an option position. Options can be offset anytime between their purchase and expiration date if the holder so desires. Most option buyers will offset their position rather than exercise the option to avoid losing

any remaining time premium and (or) assuming a futures market position and its resultant decisions, margin deposits, and commissions. In most situations, the option can be resold to another trader at a premium at least equivalent to the intrinsic value that results from an “in-the-money” price relationship.

### *Exercising an Option*

Another method by which the holder of an option could realize accrued profit is by “exercising” the option. The decision to exercise an option lies only with the holder. The opportunity to exercise the option means the option buyer can always get the intrinsic value of the option premium even if there is little or no trading in the option being held. It also provides for a means of continuing price protection after the option expires. If the decision is made to exercise, the following procedures are followed. For a put, the holder is assigned a short (sell) position in the futures market equal to the strike price. At the same time, the option grantor is assigned a long (buy) futures position at the same price. Both positions are then adjusted to reflect the current settlement price. It is rational to exercise a put option only when the futures market price is below the strike price so that the holders futures position will show a profit. The futures position of the grantor will show an equivalent loss. At this point the option contract has been fulfilled and both parties are free to trade their futures contracts as they see fit.

### *Evaluating and Using Options Markets*

Now that the mechanics of options trading has been explored, it is time to consider two critical questions. (1) What do varying strike prices mean in terms of price insurance? (2) How does a producer actually obtain this insurance?

There are three steps to consider in evaluating option prices. The first step is the selection of the appropriate option contract month. To do this, select the option whose underlying futures will expire closest to, but not before, the time the physical commodity will be sold or purchased. For example, if a group of feeder calves were to be sold in early October, the October option would be appropriate.

The second step is to select the appropriate type of option. To insure products for sale at a later time against price declines, then the producer would be interested in buying a put (the right to sell). If the producer’s motive is to insure future commodity

purchases against cost increases (for instance corn needed to feed cattle), then the purchase of a call will be needed. To continue our example: if the cattleman wishes to insure the feeders he will be selling in early October, then he will be interested in purchasing an October put option.

The third step to consider in evaluating option prices is to calculate the minimum cash selling price (MSP) being offered by the put option selected. For a call option, the maximum buying price (MPP) would need to be calculated. These calculations can be accomplished in five steps.

1. Select a strike price within the option month. For instance, a \$60 October feeder cattle put.
2. Subtract the premium from the strike price for a put or add the premium for a call. For the example, a \$60 October put cost \$2.75/cwt. So the result is  $\$60.00 - 2.75 = \$57.25/\text{cwt}$ .
3. Subtract (for a put) or add (for a call) the “opportunity cost” of paying the premium for the period it will be outstanding. For example, if the option premium of \$2.75/cwt. is paid in June and the option is expected to be liquidated by an offsetting resale in early October, an interest cost for the three month period needs to be added. If borrowed funds are used and the interest rate is 12% (for example) then the cost would be 1% per month or 3% for 3 months. The interest cost associated with a \$2.75/cwt. put option premium would be \$0.08/cwt. This leaves a net price of  $\$57.25 - \$0.08 = \$57.17/\text{cwt}$ .
4. Subtract (for a put) or add (for a call) the commission fee for both buying and offsetting the option. Assume the brokerage firm charges \$75 per round turn for handling each option contract. The per cwt. commission fee would be \$0.15 (\$75 for 50,000 lbs.). The net price is now  $\$57.17 - \$0.15 = \$57.02/\text{cwt}$ .
5. One final adjustment must be made to these prices. The option strike price must be localized to reflect the difference between prices in the local markets where the cattle will sold or grains purchased, and the futures market price. This difference is called basis. The basis differs greatly for cattle at different weights, sex, and locations across the country. See the fact sheet on basis for some of the factors which affect cattle basis. Most state extension services have historical basis estimates for cattle and inputs that may be helpful in determining the appropriate basis.

By adjusting the option price for basis, a minimum selling price can now be obtained for a put or a maximum purchase price obtained for a call. For the example, if in early October, 600 lb. feeder steers

normally bring 1.00 per cwt. more than the feeder cattle futures market, then the likely minimum local cash selling price of the option can be determined. The minimum local cash price becomes  $\$57.02 + \$1.00 = \$58.02+$ . The plus references the fact that this is the minimum price expected from a cash sale projected by a purchased put option.

More or less price insurance can be purchased by buying options with different strike prices. To determine the minimum selling price suggested by each strike price, just repeat steps 1 through 5.

### *Options Arithmetic: An Example*

Once the relevant options prices have been evaluated, the next question is how would the producer go about obtaining a certain level of price insurance. An example will help illustrate the total process. The cattleman who will be selling a load of feeder cattle in early October checks the options quotes in June and finds he could purchase an October feeder cattle option to sell (a put) at \$60/cwt. for \$2.75/cwt. To further localize this strike price, he adds \$1.00/cwt. (basis) since he normally sells 600 lb. steer calves slightly higher in October than the October futures price. Commission and premium interest cost will be about \$.25/cwt., so the \$60 put would provide an expected minimum selling price of  $\$60 + \$1.00 - \$2.75 - \$.25 = \$58/\text{cwt}$ . By comparing this with his other pricing alternatives and his production cost, he decided that the purchase of this put would be an appropriate strategy for the 83 steers he plans to sell in October. He calls his broker and advises him that he wants to purchase one “\$60 October feeder cattle put at \$2.75.” He then forwards a check for \$1450 (500 cwt. X \$2.75/cwt. plus \$75 brokerage fee) to his broker.

As October approaches, one of these three things will happen. Either prices will stay relatively unchanged or rise above the option strike price making the option worthless, or fall making the producer’s option valuable. Remember for a put option, if the current futures price is above the strike price, the option is said to be “out-of-the-money.” If futures are below the strike price, it is “in-the-money.”

First, assume the futures market prices in early October are \$65/cwt. Thus, the option is “out-of-the-money.” Since no one is willing to pay for an option to sell at \$60/cwt when they could sell currently for \$65/cwt., the option expires worthless. In this case, the cattleman sells the load of feeders and does not use the option. The net price would be the cash price received

less the net premium cost originally paid. Assuming the cattle brought \$66/cwt., the actual net received would be \$63/cwt. (\$66 - \$2.75 premium - \$.25 commission & interest).

In this case, the insurance policy was not needed. “Fire didn’t burn the barn down” and had this been known in advance the cattleman could have saved the premium. However, just as “fire” or other disasters can’t be perfectly predicted, price movements can’t be predicted with accuracy either. For this reason, the cattleman was willing to substitute the known loss (premium) for the possibility of a larger unknown loss.

What happens if the cattleman does need to collect on his option position? Assume the futures market price at the first of October is \$55/cwt. In this case, the option to sell does have value because others are willing to purchase the right to sell at \$60 when they are currently only able to sell at \$55/cwt. Remember, this means the option is “in-the-money.” One way to collect on an options policy (offset) is very much like collecting on insurance. Since the value of the loss is \$5/cwt., the cattleman should be able to sell the option back for at least this amount. He calls his broker and tells him to sell the October put at \$5 or better. This cancels the option, and the broker sends a check for \$5 per cwt. X 500 cwt. or \$2,500. Since he paid a premium of \$2.75/cwt. plus the .25/cwt option trading cost, he really netted \$2.00 on the option trade. The producer sells his calves for \$56/cwt. and adds the \$2.00/cwt. gained on the option market to get the net price of \$58.00. Thus, the option is successful in assuring the minimum price when he bought the option in June. The actions in both markets are summarized in Table 1.

In this case “fire burnt the barn” and the producer was able to collect on his option (policy). Just as with insurance, he collects to the extent of his loss. In options terminology, we are talking about the strike price (face amount of policy) less the current futures price of feeder cattle.

A second way in which the “insurance” could have been recovered would be to exercise the option, converting it into a sell (short) position in the futures market. If the futures position were then immediately closed out with a purchased October futures (long), the \$5/cwt. difference would be realized (\$60 - \$55 current futures) with only an additional commission for the futures purchase. Since fed cattle options expire before the underlying futures, this may be the route to completion of the options “insurance” if the cattle were not sold until after the option had expired. With feeder cattle, however, this is not a problem

because the futures and options expire together.

Figure 1 summarizes the resulting net price from purchasing an October put for \$2.75/cwt. with \$.25/cwt. trading cost under several futures market prices in October and a realized +\$1.00/cwt. basis. It also makes clear why put option purchases are sometimes referred to as “floor pricing”.

Actually, the producer will not be able to judge in advance exactly what his basis will be when he sells the cattle. If the actual basis is better than anticipated, then the realized net price from the options will be higher by this amount. If the actual basis is worse than anticipated, then the realized net price from the options will be lower by this amount.

### *Buying More or Less Insurance*

Figure 2 shows the results of buying more or less insurance than the \$60 put offers. For instance a \$64 put could have been purchased for \$4.95/cwt. This would have provided a higher floor price but at the expense of giving up more of the upside potential. A \$56 put would have cost only \$1.35/cwt. but provided a floor of only \$55.40/cwt. If the cattleman can accept the reduced coverage of the lower cost strike price, then he will give up less of any potential price increase. Its obvious from a comparison of each of the strategies that cattlemen should buy only as much insurance as needed.

### *Summary*

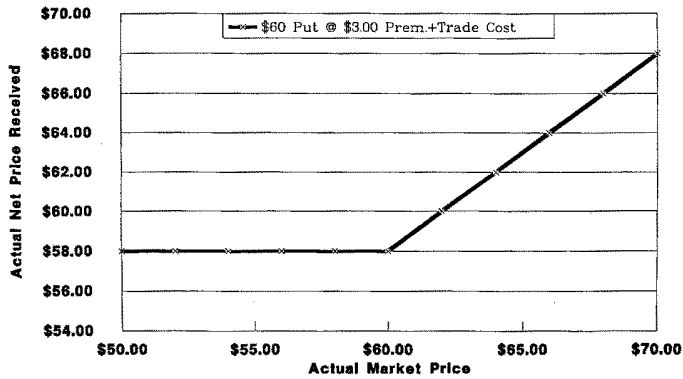
Purchasing options for price insurance is a way cattlemen can use the options markets as a pricing alternative. This alternative should be carefully compared to all other pricing alternatives in light of the producer’s objectives and risk bearing ability. Options purchased for price insurance provide a kind of “hybrid” market with characteristics of both doing nothing (cash market pricing) and hedging or forward contracting. That is, the producer who purchases an option for price insurance has some of the same price protection offered through a hedge or forward contracting. On the other hand, options are not as protective against unfavorable price movements as hedging or forward contracting, or as attractive as the open cash market if prices become more favorable. In fact, option purchases will always be, at best, second to either of the other two pricing alternatives when evaluated after the fact. However, cattlemen do not have the luxury of making pricing decision after-the-fact. Because of this, many cattlemen may find a place

in their pricing plans for the kind of “hybrid vigor” offered through the option market.

**Table 1. Feeder Cattle Price Decline Example**

Cash Market	Feeder Cattle Option Market
June 1	
Expect to sell 83 hd. in early October, Expected basis = +1.00, So Expect minimum selling price of \$58.00 (Strike price - premium & trade cost + basis)	Buy an October Feeder Cattle put option at a \$60 strike price for \$2.75 per cwt. Premium, trading cost \$.25/cwt.
October 10	
Sell 83 hd. feeder steers locally @ \$56.00/cwt.	October feeder cattle futures trading at \$55. Sell \$60 October put and collect \$5 premium.
Results	
	Offset premium received - original premium & trading cost paid = \$5 - \$2.75 - \$.25 = <b>\$2.00</b>
Cash price + gain or loss in options market = actual price received OR \$56 + \$2 = <b>\$58/cwt.</b>	

**Figure 1. Possible outcomes when a \$60 October put is purchased, +\$1.00/cwt. basis.**



**Figure 2. Possible outcomes from a \$64 and \$56 October feeder cattle put purchase, +\$1.00/cwt. basis.**

